

**WHAT IS CLAIMED IS:**

1. A feed horn comprising a horn portion having an end aperture and an interior surface portion defining an exponential taper converging inwardly and an elongated dielectric rod portion substantially centered with respect to said horn portion  
 5 and having an elongated tapered end part extending in the direction of the horn aperture.

2. The feed horn of claim 1 wherein said horn has a generally cylindrical metallic interior surface portion which extends from said exponential taper and substantially encloses the tapered part of said dielectric rod, such that a free end of the  
 10 rod is substantially coextensive with the plane of said aperture of said horn.

3. The feed horn of claim 2 wherein said interior surface portion having an exponential taper converges inwardly to an input bore of the horn portion.

15 4. The feed horn of claim 1 wherein said exponential taper begins and extends inwardly of said horn aperture, and wherein said dielectric rod tapered end part extends outwardly beyond said aperture.

5. The feed horn of claim 1 wherein the dielectric rod tapered end part  
 20 extends such that said horn portion is substantially in a radiation shadow of the dielectric rod.

6. A feed horn which produces a symmetrical radiation pattern and has a substantially constant phase center over a wide frequency range, said feed horn  
 25 comprising:

a horn portion having an end aperture and an interior surface portion defining an exponential taper converging inwardly and an elongated dielectric rod portion substantially centered with respect to said horn portion and having an elongated tapered end part extending in the direction of the horn aperture.

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7 The feed horn of claim 6 wherein said exponential taper begins and extends inwardly of said horn aperture, and wherein said dielectric rod tapered end part extends outwardly beyond said aperture.

8. The feed horn of claim 6 wherein the dielectric rod tapered end part extends such that said horn portion is substantially in a radiation shadow of the dielectric rod.

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9. The feed horn of claim 6 wherein said frequency range is from about 12 GHz to about 30 GHz.

10. The feed horn of claim 6 wherein said frequency range is from about 5  
10 GHz to about 7 GHz.

11. A method of transmitting or receiving electromagnetic radiation using a feed horn assembly, said method comprising:

producing a symmetrical radiation pattern having a substantially constant phase  
15 center over a wide frequency range, using a horn portion having an end aperture and an interior surface portion defining an exponential taper converging inwardly and an elongated dielectric rod portion substantially centered with respect to said horn portion and having an elongated tapered end part extending in the direction of the horn aperture.

20 12. The method of claim 11 wherein said horn has a generally cylindrical metallic interior surface portion which extends from said exponential taper and substantially encloses the tapered part of said dielectric rod, such that a free end of the rod is substantially coextensive with the plane of said aperture of said horn.

25 13. The method of claim 12 wherein said interior surface portion having an exponential taper converges inwardly to an input bore of the horn portion

14. The method of claim 11 wherein said exponential taper begins and extends inwardly of said horn aperture, and wherein said dielectric rod tapered end part extends  
30 outwardly beyond said aperture.

15. The method of claim 11 wherein the dielectric rod tapered end part extends such that said horn portion is substantially in a radiation shadow of the dielectric rod.

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